



SEQUENCE LISTING

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Her, Jeng-Horng
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<120> Circularly Permutated, Interaction-Activated Proteins

<130> 021167-000710US

<140> US 09/764,163

<141> 2001-01-16

<150> US 60/175,968

<151> 2000-01-13

<150> US 09/526,106

<151> 2000-03-15

<160> 26

<170> PatentIn Ver. 2.1

<210> 1

<211> 789

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(789)

<223> TEM-1 beta-lactamase

<400> 1

cac	cca	gaa	acg	ctg	gtg	aaa	gta	aaa	gat	gct	gaa	gat	cag	ttg	ggc	48
His	Pro	Glu	Thr	Leu	Val	Lys	Val	Lys	Asp	Ala	Glu	Asp	Gln	Leu	Gly	
1				5					10					15		

gca	cga	gtg	ggc	tac	atc	gaa	ctg	gat	ctc	aac	agc	ggc	aag	atc	ctt	96
Ala	Arg	Val	Gly	Tyr	Ile	Glu	Leu	Asp	Leu	Asn	Ser	Gly	Lys	Ile	Leu	
		20						25					30			

gag	agt	ttt	cgc	ccc	gaa	gaa	cgt	ttt	cca	atg	atg	agc	act	ttt	aaa	144
Glu	Ser	Phe	Arg	Pro	Glu	Glu	Arg	Phe	Pro	Met	Met	Ser	Thr	Phe	Lys	
		35					40					45				

gtt	ctg	cta	tgt	ggc	gcg	gta	tta	tcc	cgt	att	gac	gcc	ggg	caa	gag	192
Val	Leu	Leu	Cys	Gly	Ala	Val	Leu	Ser	Arg	Ile	Asp	Ala	Gly	Gln	Glu	
	50					55					60					

caa	ctc	ggc	cgc	cgc	ata	cac	tat	tct	cag	aat	gac	ttg	gtt	gag	tac	240
Gln	Leu	Gly	Arg	Arg	Ile	His	Tyr	Ser	Gln	Asn	Asp	Leu	Val	Glu	Tyr	
65					70				75					80		

tca	cca	gtc	aca	gaa	aag	cat	ctt	acg	gat	ggc	atg	aca	gta	aga	gaa	288
Ser	Pro	Val	Thr	Glu	Lys	His	Leu	Thr	Asp	Gly	Met	Thr	Val	Arg	Glu	
			85						90					95		

tta	tgc	agt	gct	gcc	ata	acc	atg	agt	gat	aac	act	gcg	gcc	aac	tta	336
Leu	Cys	Ser	Ala	Ala	Ile	Thr	Met	Ser	Asp	Asn	Thr	Ala	Ala	Asn	Leu	
			100						105					110		

ctt ctg aca acg atc gga gga ccg aag gag cta acc gct ttt ttg cac 384
 Leu Leu Thr Thr Ile Gly Gly Pro Lys Glu Leu Thr Ala Phe Leu His
 115 120 125

aac atg ggg gat cat gta act cgc ctt gat cgt tgg gaa ccg gag ctg 432
 Asn Met Gly Asp His Val Thr Arg Leu Asp Arg Trp Glu Pro Glu Leu
 130 135 140

aat gaa gcc ata cca aac gac gag cgt gac acc acg atg cct gta gca 480
 Asn Glu Ala Ile Pro Asn Asp Glu Arg Asp Thr Thr Met Pro Val Ala
 145 150 155 160

atg gca aca acg ttg cgc aaa cta tta act ggc gaa cta ctt act cta 528
 Met Ala Thr Thr Leu Arg Lys Leu Leu Thr Gly Glu Leu Leu Thr Leu
 165 170 175

gct tcc cgg caa caa tta ata gac tgg atg gag gcg gat aaa gtt gca 576
 Ala Ser Arg Gln Gln Leu Ile Asp Trp Met Glu Ala Asp Lys Val Ala
 180 185 190

gga cca ctt ctg cgc tcg gcc ctt ccg gct ggc tgg ttt att gct gat 624
 Gly Pro Leu Leu Arg Ser Ala Leu Pro Ala Gly Trp Phe Ile Ala Asp
 195 200 205

aaa tct gga gcc ggt gag cgt ggg tct cgc ggt atc att gca gca ctg 672
 Lys Ser Gly Ala Gly Glu Arg Gly Ser Arg Gly Ile Ile Ala Ala Leu
 210 215 220

ggg cca gat ggt aag ccc tcc cgt atc gta gtt atc tac acg acg ggg 720
 Gly Pro Asp Gly Lys Pro Ser Arg Ile Val Val Ile Tyr Thr Thr Gly
 225 230 235 240

agt cag gca act atg gat gaa cga aat aga cag atc gct gag ata ggt 768
 Ser Gln Ala Thr Met Asp Glu Arg Asn Arg Gln Ile Ala Glu Ile Gly
 245 250 255

gcc tca ctg att aag cat tgg 789
 Ala Ser Leu Ile Lys His Trp
 260

<210> 2

<211> 263

<212> PRT

<213> Escherichia coli

<220>

<223> TEM-1 beta-lactamase

<400> 2

His Pro Glu Thr Leu Val Lys Val Lys Asp Ala Glu Asp Gln Leu Gly
 1 5 10 15

Ala Arg Val Gly Tyr Ile Glu Leu Asp Leu Asn Ser Gly Lys Ile Leu
 20 25 30

Glu Ser Phe Arg Pro Glu Glu Arg Phe Pro Met Met Ser Thr Phe Lys
 35 40 45

Val Leu Leu Cys Gly Ala Val Leu Ser Arg Ile Asp Ala Gly Gln Glu
 50 55 60

Gln Leu Gly Arg Arg Ile His Tyr Ser Gln Asn Asp Leu Val Glu Tyr
 65 70 75 80
 Ser Pro Val Thr Glu Lys His Leu Thr Asp Gly Met Thr Val Arg Glu
 85 90 95
 Leu Cys Ser Ala Ala Ile Thr Met Ser Asp Asn Thr Ala Ala Asn Leu
 100 105 110
 Leu Leu Thr Thr Ile Gly Gly Pro Lys Glu Leu Thr Ala Phe Leu His
 115 120 125
 Asn Met Gly Asp His Val Thr Arg Leu Asp Arg Trp Glu Pro Glu Leu
 130 135 140
 Asn Glu Ala Ile Pro Asn Asp Glu Arg Asp Thr Thr Met Pro Val Ala
 145 150 155 160
 Met Ala Thr Thr Leu Arg Lys Leu Leu Thr Gly Glu Leu Leu Thr Leu
 165 170 175
 Ala Ser Arg Gln Gln Leu Ile Asp Trp Met Glu Ala Asp Lys Val Ala
 180 185 190
 Gly Pro Leu Leu Arg Ser Ala Leu Pro Ala Gly Trp Phe Ile Ala Asp
 195 200 205
 Lys Ser Gly Ala Gly Glu Arg Gly Ser Arg Gly Ile Ile Ala Ala Leu
 210 215 220
 Gly Pro Asp Gly Lys Pro Ser Arg Ile Val Val Ile Tyr Thr Thr Gly
 225 230 235 240
 Ser Gln Ala Thr Met Asp Glu Arg Asn Arg Gln Ile Ala Glu Ile Gly
 245 250 255
 Ala Ser Leu Ile Lys His Trp
 260

<210> 3

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:linker

<400> 3

Gly Gly Gly Gly Ser
 1 5

<210> 4

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:flexible linker

<400> 4
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1 5 10 15

```
<210> 5
<211> 6
<212> PRT
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence:hexa-histidine
tag
```

<400> 5
His His His His His His
1 5

```
<210> 6
<211> 5
<212> PRT
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence:flexible linker
      of variable length
```

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<220>
<221> REPEAT
<222> (1)..(5)
<223> (G-4S)-x, amino acids 1-5 may be repeated an
        undefined number of times
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<400> 6
Gly Gly Gly Gly Ser
1 5

```
<210> 7
<211> 267
<212> PRT
<213> Escherichia coli
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<220>
<223> Neomycin phosphotransferase II (NPTII)

```
<400> 7
Met Gly Ser Ala Ile Glu Gln Asp Gly Leu His Ala Gly Ser Pro Ala
  1             5             10             15
```

Ala Trp Val Glu Arg Leu Phe Gly Tyr Asp Trp Ala Gln Gln Thr Ile
20 25 30

Gly Cys Ser Asp Ala Ala Val Phe Arg Leu Ser Ala Gln Gly Arg Pro
35 40 45

Val Leu Phe Val Lys Thr Asp Leu Ser Gly Ala Leu Asn Glu Leu Gln
50 55 60

Asp Glu Ala Ala Arg Leu Ser Trp Leu Ala Thr Thr Gly Val Pro Cys
 65 70 75 80
 Ala Ala Val Leu Asp Val Val Thr Glu Ala Gly Arg Asp Trp Leu Leu
 85 90 95
 Leu Gly Glu Val Pro Gly Gln Asp Leu Leu Ser Ser His Leu Ala Pro
 100 105 110
 Ala Glu Lys Val Ser Ile Met Ala Asp Ala Met Arg Arg Leu His Thr
 115 120 125
 Leu Asp Pro Ala Thr Cys Pro Phe Asp His Gln Ala Lys His Arg Ile
 130 135 140
 Glu Arg Ala Arg Thr Arg Met Glu Ala Gly Leu Val Asp Gln Asp Asp
 145 150 155 160
 Leu Asp Glu Glu His Gln Gly Leu Ala Pro Ala Glu Leu Phe Ala Arg
 165 170 175
 Leu Lys Ala Arg Met Pro Asp Gly Glu Asp Leu Val Val Thr His Gly
 180 185 190
 Asp Ala Cys Leu Pro Asn Ile Met Val Glu Asn Gly Arg Phe Ser Gly
 195 200 205
 Phe Ile Asp Cys Gly Arg Leu Gly Val Ala Asp Arg Tyr Gln Asp Ile
 210 215 220
 Ala Leu Ala Thr Arg Asp Ile Ala Glu Glu Leu Gly Gly Glu Trp Ala
 225 230 235 240
 Asp Arg Phe Leu Val Leu Tyr Gly Ile Ala Ala Pro Asp Ser Gln Arg
 245 250 255
 Ile Ala Phe Tyr Arg Leu Leu Asp Glu Phe Phe
 260 265

<210> 8

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 8

Cys Gly Pro Lys Glu Leu Arg Ile Gly Gly Arg Pro Arg Arg Pro Gly
 1 5 10 15

Pro Cys

<210> 9

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 9

Cys Gly Pro Glu Gly Gln Gly Gly Val Ala Val Gly Gly Val Gly Gly
1 5 10 15

Pro Cys

<210> 10

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 10

Cys Gly Pro Ala Lys Arg Ala Asp Val Glu Phe Ser Leu Glu Pro Gly
1 5 10 15

<210> 11

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 11

Ala Lys Pro Cys Gly Gln Gln Ser Ile His Leu Gly Gly Val Phe Glu
1 5 10 15

Leu Gln Pro Gly Ala
20

<210> 12

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 12

Cys Gly Pro Lys Ser Ala Gly Lys Gly Arg Lys Asp Arg Arg Lys Gly
1 5 10 15

Pro Cys

<210> 13
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 13
 Cys Gly Pro Pro Arg Thr Arg Val Asn His Gln Gly Gln Lys Thr Arg
 1 5 10 15

Gly Pro Cys

<210> 14
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 14
 Cys Gly Pro Ala Gly Ala Ile Arg His Glu His Arg Gln Gly Leu Gly
 1 5 10 15

Pro Cys

<210> 15
 <211> 23
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 15
 Leu Val Thr Leu Glu Asn Gly Lys Gln Leu Thr Val Lys Arg Gln Gly
 1 5 10 15

Leu Tyr Tyr Ile Tyr Ala Gln
 20

<210> 16
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 16

Cys Gly Pro Asp Thr Gly Leu Glu Thr Asp Ala Ala Asp Ala Ser Gly
 1 5 10 15

Pro Cys

<210> 17

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 17

Cys Gly Pro Arg Arg Val Arg Glu Thr Val Ala Val Glu Ser Ser Gly
 1 5 10 15

Pro Cys

<210> 18

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 18

Cys Gly Pro Pro Cys Ala Thr Phe Glu Glu Ala Lys Ser Asn Gln Gly
 1 5 10 15

Pro Cys

<210> 19

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 19

Glu Thr Lys Lys Glu Asn Ser Phe Glu Met Gln Lys Gly Asp Gln Asn
 1 5 10 15

Pro Gln

<210> 20

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 20

Cys Gly Pro Gly Arg Glu Ser Arg Gly Arg Cys Tyr Thr Pro Ser Gly
1 5 10 15

Pro Cys

<210> 21

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 21

Thr Asp Pro Ser Gln Val Ser His Gly Thr Gly Phe Thr Ser Phe Gly
1 5 10 15

Leu Leu

<210> 22

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 22

Cys Gly Pro Asn Thr Pro Asp Glu Glu Met Ala Pro Gln Ala Pro Gly
1 5 10 15

Pro Cys

<210> 23

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:CD40-binding
Trxpep

<400> 23

Cys Gly Pro Val Val His Ile Lys Thr Asn Glu Gln Ala Ala Pro Gly
1 5 10 15

Pro Cys

<210> 24
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:CD40-binding
 Trxpep

<400> 24
 Cys Gly Pro Val Ala Glu Glu Pro Ala Gly Gly Ala Gly Arg Pro Gly
 1 5 10 15

Pro Cys

<210> 25
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Her-2/neu
 Tyr1068 phosphorylation substrate peptide

<400> 25
 Pro Val Pro Glu Tyr Ile Asn Gln Ser
 1 5

<210> 26
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:short flexible
 linker

<400> 26
 Pro Gly Ser Gly Gly
 1 5